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Radiation Dose Chart

Typical doses from X-rays, CT, mammography, nuclear medicine and everyday sources, in mSv and mrem

For: Patients, students, radiographers, teachers and anyone comparing radiation doses

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EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
1 mSv = 100 mrem. Effective dose lets exposures of different body parts be compared on one scale	Comparable background time = dose ÷ yearly natural background dose	Dose = background dose per year × time	CT chest 6.1 mSv ÷ 3 mSv per year ≈ 2 years of US natural background

Typical adult values from the cited sources. Real doses vary with body size, equipment and protocol; children differ from adults.

Medical imaging: typical adult effective doses (RadiologyInfo, US)

Background time uses 3 mSv per year and chest X-ray equivalents use 0.1 mSv, the basis of this source.

Exam	Effective dose	mrem	Comparable natural background	Chest X-ray equivalents
Extremity X-ray (hand, foot)	< 0.001 mSv	< 0.1	< 3 hours	< 0.01
Bone densitometry (DEXA)	0.001 mSv	0.1	3 hours	0.01
Dental X-ray (intraoral)	0.005 mSv	0.5	15 hours	0.05
Panoramic dental X-ray	0.025 mSv	2.5	3 days	0.25
Chest X-ray	0.1 mSv	10	12 days	1
Dental cone beam CT	0.18 mSv	18	22 days	1.8
Screening digital mammography	0.28 mSv	28	34 days	2.8
Breast tomosynthesis (3D mammogram)	0.34 mSv	34	41 days	3.4
CT head and neck	1.2 mSv	120	4.8 months	12
Lumbar spine X-ray	1.4 mSv	140	5.6 months	14
CT lung cancer screening	1.5 mSv	150	6 months	15
CT brain	1.6 mSv	160	6.4 months	16
Cardiac CT for calcium scoring	1.7 mSv	170	6.8 months	17
Intravenous urography (IVU)	3 mSv	300	1 year	30
CT brain, with and without contrast	3.2 mSv	320	1.1 years	32
Non-cardiac CT angiography	5.1 mSv	510	1.7 years	51
CT colonography	6 mSv	600	2 years	60
Barium enema (lower GI X-ray)	6 mSv	600	2 years	60
Upper GI study with barium	6 mSv	600	2 years	60
CT chest	6.1 mSv	610	2 years	61
CT abdomen and pelvis	7.7 mSv	770	2.6 years	77
Coronary CT angiography	8.7 mSv	870	2.9 years	87
CT spine	8.8 mSv	880	2.9 years	88
CT abdomen and pelvis, with and without contrast	15.4 mSv	1,540	5.1 years	150
PET/CT, whole body	22.7 mSv	2,270	7.6 years	230

Everyday sources and reference doses (UKHSA, UK)

Background time uses the UK average of 2.6 mSv per year; chest X-ray equivalents use 0.014 mSv, the UKHSA figure.

Source of exposure	Dose	mrem	Equivalent UK background	Chest X-ray equivalents
Dental X-ray	0.005 mSv	0.5	17 hours	0.36
100 g of Brazil nuts	0.01 mSv	1	1.4 days	0.71

Source of exposure	Dose	mrem	Equivalent UK background	Chest X-ray equivalents
Chest X-ray	0.014 mSv	1.4	2 days	1
Transatlantic flight	0.08 mSv	8	11 days	5.7
Nuclear power station worker, average annual occupational dose (2010)	0.18 mSv	18	25 days	13
UK annual average radon dose	1.3 mSv	130	6 months	93
CT scan of the head	1.4 mSv	140	6.5 months	100
UK average annual radiation dose	2.6 mSv	260	1 year	190
USA average annual radiation dose	6.2 mSv	620	2.4 years	440
CT scan of the chest	6.6 mSv	660	2.5 years	470
Average annual radon dose to people in Cornwall	6.9 mSv	690	2.7 years	490
CT scan of the whole spine	10 mSv	1,000	3.8 years	710
Annual exposure limit for nuclear industry employees	20 mSv	2,000	7.7 years	1,400
Level at which changes in blood cells can be readily observed	100 mSv	10,000	—	—
Acute radiation effects, including nausea and a reduced white blood cell count	1,000 mSv	100,000	—	—
Dose that would kill about half of those receiving it within a month	5,000 mSv	500,000	—	—

Reading these numbers

Point	Why it matters
Compare within one table	Published typical doses differ between countries and sources (a chest X-ray is 0.1 mSv in the US table and 0.014 mSv in the UK table). Compare exams using the same table.
Effective dose	A radiation-protection quantity for comparing exposures, not an exact measure of one person's risk.
Children and pregnancy	Doses for children differ from adult values. Tell the radiographer if you are or may be pregnant.
Your own exam	This chart is for education, not medical advice. Ask your doctor or radiographer about the benefit and dose of a specific exam.

Sources and method

- **RadiologyInfo.org (ACR and RSNA), Radiation Dose in X-Ray and CT Exams (reviewed 15 April 2025)** — Typical adult effective doses; comparable background based on about 3 mSv per year (www.radiologyinfo.org/en/info/safety-xray)
- **UKHSA, Ionising radiation: dose comparisons (updated 28 September 2026)** — Contains public sector information licensed under the Open Government Licence v3.0 (www.gov.uk/government/publications/ionising-radiation-dose-comparisons/ionising-radiation-dose-comparisons)
- **ICRP Publication 103 (2007)** — Radiation weighting factors and dose limits; lens of the eye per ICRP Publication 118 (2011) (www.icrp.org/publication.asp?id=ICRP%20Publication%20103)

Doses are transcribed from the sources listed; the mrem, background-time and chest X-ray columns are calculated from them on the basis stated above each table. Interactive version, corrections and more charts: **allunitconversions.com/radiation-dose-chart**